

Applicant : Tomohiro Kawase et al
Serial No. : 09/824,965
Filed : April 3, 2001
Page : 2

Attorney's Docket No.: 12967-002001

42. The method of preparing a carbon-doped group III-V compound semiconductor according to claim 41, wherein said boron oxide substance contains 10-500 wt ppm of said water.

43. The method of preparing a carbon-doped group III-V compound semiconductor according to claim 40, wherein said amount of said carbon in contact with said melted boron oxide substance is at least 10 times larger than said amount of carbon doped into said crystalline semiconductor.

44. The method of preparing a carbon-doped group III-V compound semiconductor according to claim 40, further comprising a step of subjecting solid carbon to a heat treatment under reduced pressure before melting said boron oxide substance in contact with said carbon.

45. The method of preparing a carbon-doped group III-V compound semiconductor according to claim 44, comprising carrying out said heat treatment for 1 hour to 12 hours at a temperature of 500° C. - 2000° C. under a pressure of 1 Torr - 1x 10⁻⁸ Torr.

46. The method of preparing a carbon-doped group III-V compound semiconductor according to claim 45, further comprising a step of maintaining said melted compound raw material in a melted state for a certain time period before said step of solidifying said melted raw material.

47. The method of preparing a carbon-doped group III-V compound semiconductor according to claim 46, wherein said step of maintaining said melted compound raw material in a melted state is carried out for 3 - 72 hours.

48. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 40, further comprising selecting a target amount of said carbon to be doped into said compound semiconductor crystal, and adjusting said amount of said carbon in

Applicant : Tomohiro Kawase et al
Serial No. : 09/824,965
Filed : April 3, 2001
Page : 3

Attorney's Docket No.: 12967-002001

contact with said melted boron oxide substance so as to responsively achieve said target amount of said carbon to be doped into said semiconductor crystal.

49. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 40, wherein said carbon comprises powder carbon.

50. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 42, wherein said carbon comprises powder carbon.

51. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 40, wherein said carbon comprises fiber carbon.

52. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 42, wherein said carbon comprises fiber carbon.

53. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 40, wherein said compound raw material comprises GaAs, and wherein said compound semiconductor crystal comprises a single crystal of GaAs.

54. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 53, carried out such that said carbon-doped compound semiconductor crystal has a variation of carbon concentration of not more than 8-1/3% between a lowest carbon concentration and a highest carbon concentration, relative to said lowest carbon concentration.

55. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 53, wherein said boron oxide substance comprises boron oxide and water.

Applicant : Tomohiro Kawase et al
Serial No. : 09/824,965
Filed : April 3, 2001
Page : 4

Attorney's Docket No.: 12967-002001

56. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 55, wherein said boron oxide substance contains 10-500 wt ppm of said water.

57. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 53, wherein said amount of said carbon in contact with said melted boron oxide substance is at least 10 times larger than said amount of carbon doped into said compound semiconductor crystal.

58. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 53, further comprising a step of subjecting solid carbon to a heat treatment under reduced pressure before melting said boron oxide substance in contact with said carbon.

59. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 58, comprising carrying out said heat treatment for 1 hour to 12 hours at a temperature of 500° C. - 2000° C. under a pressure of 1 Torr - 1×10^{-8} Torr.

60. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 53, further comprising a step of maintaining said melted compound raw material in a melted state for a certain time period before said step of solidifying said melted raw material to grow said crystal.

61. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 60, wherein said step of maintaining said melted compound raw material in a melted state is carried out for 3-72 hours.

62. The method of preparing a carbon-doped group III-V compound semiconductor crystal according to claim 53, further comprising selecting a target amount of said carbon to be doped into said compound semiconductor crystal, and adjusting said amount of said carbon in